CEBVS CAPVCINVS

III

Cebus capucinus, I. August 23, 1961
Barro Colorado

Going to put Orlk in an outside cage, with the new Sifted Capu
Uchin, Jose'. 7:45 a.m.

Orlk utters S-hll's and a few AlB's when pulled up by Boca.
Then settles happily and silently in Boca's arms.

Goes into Hold when put into Jose's cage: Utters a few Hll's, MGB's, etc., but all or most of these seem to be provoked by or directed toward me.

Does silent BT several times when looking at Jose'. Once this silent BT was followed, immediately, by Lsh & a "strangled" AlB. Then back to silent Hold.

While Hold-ing, Orlk does quite a bit of "pseudo suckling". Again most probably directed toward me than to Jose'.

Does extreme MO+BT, silently, when suddenly noticing ♀ Cuvas row closely. Still in Hold.

Gradually relaxes a little sits up, but keeps hands firmly clutching stomach. Such clutching is obviously a mild alarm reaction. A persistence or reversion to juvenile-infantile behavior. Quite silent.

Then sticks tongue out while watching Cuarrow. Then starts to circle floor and inside of cage. Silently Still clutching stomach

Does MO+BT, with Lsh & AlB, when I move suddenly.

Then MO, without BT, followed by "pseudo suckling" when the Cuarrow moves

Still sitting, clutching himself, usually silent 8:15. Apparently is moving Jose'. Beginning to explore his immediate environment a little. Ca

occasionally stops clutching momentarily, to handle a leaf or twig on the bottom of the cage, or to feel the wire mesh.

Does extreme MO, without BT, when Casanova moves again. Then utters 3 or 4 Q's. In rapid series. Almost TW. MO more or less maintained throughout the Q's. Then does one Lip, silent, relaxes.

I think these MO's without BT must be produced by moderately strong motivation. Escape predominant, but attack by no means negligable.

Probably just slightly lower intensity than Q's (and AB's?)

Boca brings food to cage, puts it beside Ork, 8:20. Jane comes down to get food. Ork performs one brief Hold when Jane comes close. Nothing more. Feeding himself.

Ork utters SHill's, goes into Hold, then does MO, with Q Notes, then relaxes, when I cough suddenly.

It is interesting that Ork has done no SS this morning. Nor any "bouncing". As bouncing may be closely related to typical Juv, this would seem to be an indication that he is quite definitely alarmed today. Also suggests that the SS of this species may contain a quite appreciable attack component???

Perhaps the SS Ork did a couple of days ago was just a combination of Juv movements combined with the clutching semi-Hold crouch???

Behavior continuing more or less as before 8:55. Ork pretty steadily crouched or Hold'd on floor of cage. Clutching himself steadily. Usually silent. Occasionally utters SHill, usually or always directed toward me. Occasionally utters Q or AB, when something moves outside cage.

Once looks up at Jane, with tongue sticking out (the mouth always remains closed when the tongue is stuck out in this way). This pattern would appear to be ritualized. I shall call it "Ton". Low intensity hostility?

Alarm??

Every once in a while, Ork does a little "Pseudo-nibbling" when Coo brings at me. Silent. Sometimes accompanied by very pronounced "chewing" movements, sometimes with rotating few "chewing" movements. Not usually accompanied by "frowning". More friendly than "Pseudo-nibbling" with frowning?

Every once in a while, Ork also "raises his eyebrows" while looking at me. Sometimes with "Pseudo-nibbling", sometimes without. Usually silent sometimes with soft and brief S-Nll's when performed apart from "Pseudo-nibbling".

I have seen this "eyebrow raising" before, but have not, I think, commented upon it. I think it is an "int. mov" of frowning. At least, it frequently immediately precedes frowning.

Ork starts to relax a little more around 9:10 Looking around up, as if were going to start climbing on branches soon. Then suddenly starts SS while looking at me. Accompanied by a jumble of silent "Pseudo nibbling", with pronounced chewing, and frowning, Soh's, Squ's, and Aug S-Nll's. All in semi-crouch. Then relaxes again. Starts to reach for branches again.

Perhaps the frowning is really a sign of aggressiveness?

Ork crouches again 9:15. (All its crouches today have been with silent nibbling). Looks at me for a long time, with Soh. Silent. No other movements.

Then when Joe comes down to get food again (9:12), Ork just sits eats a few fruit, crouches again, silently. No other display!

Then Ork goes to sleep 9:20. Wakes up when Joe passes overhead. Opens eyes. Doesn't move. But does do silent Soh at Joe!

Soh is obviously very very low intensity!

Orle wakes up 7:45. Looks at Jose'. Does SS in clutching semi-crouch, with Jon. Quite silent. So Jon may not contain as relatively strong an escape component as some other patterns.

Then Orle goes over to feed. Moves around cage a little, on the floor. Utters quite a lot of MGB's as it moves and feeds. Single notes.

Then does silent MO at me. Without other displays. 7:50

Then starts to go back into clutching crouch. With a few slow bouncing movements. And silent Jon. Apparently directed at me

Now sitting up & very erect. Still clutching stomach. Occasional slow bouncing movements. Silent Jon. Apparently directed to Jose' 7:55

Looking at Jose' much more steadily than it ever has before.

Sometimes raises eyebrows when looking at Jose' with Jon.

Sometimes its slow bounces develop into a slight trace of SS

Now looking at me. Setting up Clutching: Alternating periods of silent Jon with periods of "Pseudo-mobbing" with frowns. Sometimes utters SMll's more or less intermingled with other patterns. Then does Lob with one low intensity BB!

Then starts to move around again. Immediately starts to utter single MGB's when it moves! 10:00 a.m.

Then sits. Does silent Jon to me

Then moves again. Utters MGB's and 1 SMll.

Then sits. Clutching but not crouched Utters SMll's, 1 BB, 1 alB Then moves again Immediately starts uttering single MGB's

Then utters MGB's and SMll's, in apparently random sequence

Then sits again. Silent 10:05.

Leaving myself.

Annie back to watch animals 4:50

Said both animals in approximately the same position I left them this morning. Orb crouching on floor. Jore' pacing on branches.

Orb's crouch is still more or less cluttering. He "erects" by appearance by superimposing a lot of patterns on the crouch. Almost continuous bouncing and SS. When I first appeared, this bouncing and SS was accompanied by S Fill's. Then he began Fslı's. Fslı's first accompanied by S Fill's, then by rather ambiguous B's, apparently including both AB's and abbreviated BB's. Then he performed a long series of different patterns jumbled together in apparently random order. Periods of silent "Pseudo-seething." Periods of S Fill-ing. Many Fslı's. Most of the Fslı's with abbreviated B patterns. Probably also including both AB's and abbreviated BB's. A few Fslı's with S Fill's. All superimposed upon the continuous bouncing and SS.

All this is quite reminiscent of Orb's behavior up in the animal house a few days ago. His repertory seems to be quite standardized now.

Once Orb interrupts his reaction to me to do silent MO toward Jore'. I am now fairly certain that this silent MO is a low-intensity alarm reaction. Lower intensity than AB or S. Probably (?) not containing any friendly component.

Then Orb starts to move around. Again immediately starts to utter MGB's. Also a few Squ's.

Still ignoring Jore' almost completely.

Orb seems quite upset when an adult ♂ Spider Monkey ambles on tops of the cage. Utters a lot of single AB Notes. Alternated with periods of silent MO. MO sometimes with slight trace of BT, but not usually. Once utters a (AB - S) notes, in rapid succession — —, just end of typical single AB Note. All these notes, and the MO, accompan

rid by vigorous retreat movements. 5:10

Then when Spider Monkey leaves, Osk starts to move around cage again. Again emits single MGB's.

Is this MGB purely a locomotor pattern ???? Functioning as a contact note ?????

Osk also utters single SFill's, occasionally, in between its MGB's as it moves.

This combination of MGB's and SFill's with movement is quite reminiscent of the behavior of juvenile White faces in the wild.

Osk continues behaving like this, uttering MGB's and SFill's, exploring its cage, for quite a long while. Still doing so 5:40.

Every once in a while utters a sudden burst of 3 or 4 SFill's, all together. Usually or always when I make a sudden movement. Apparently alarm. But must contain a relatively weaker alarm component than the MO-alB-S patterns.

The softest single SFill's are presumably produced when motivation is actually very weak. But the bursts of SFill's sound quite high intensity.

Once Osk utters a burst of short BB notes. Without LiLi's. Appar ently directed to me but certainly not provoked by any sudden move on my part.

Sometimes Osk gets quite close to Jane' in the course of its wanderi ngs. But it doesn't display. Just looks at Jane'. Not even frowning or raising eyebrows or Jan!

Then Osk approaches Jane' twice more. Each time puts hand out, and tentatively touches Jane' on back. But. mov of social grooming? Qui te silent. Each time Jane' just runs away.

Then I go in to do a little experimenting with Jane' Stop wate

Cebus capucinus, Aug. 23, 1961, VII

hung Orle. Leave 6:10.

Thinking things over, I wouldn't be at all surprised if Orle's SS (or SS + bounce) were a "learned signal".

Cebus capucinus, I — September 14, 1966, Barro Colorado

7:53 a.m. Barbour Trail. Come across group A. One AdB when we first arrive. Then several single MGB's (very plaintive) by sub-adult near us. Sometimes with JVD. Sometimes without.

NOTE: This group is used to being fed by Oppenheimer. Subadult uttering MGB's is approaching us.

MGB's usually with little or no facial expression. Pom by PL.

7:59. Now several more mels. approaching. Adults? all uttering areas. single MGB's and (MGB - AdB)'s.

Single Double-toothed Kite with band.

Group rather widely scattered. Inds ranging 2-100 ft apart. 10-75 ft up.

More plaintive MGB's. Also STrill's & WTrill's in neighborhood. Apparently all attract by 1 mel (cummble).

Now 1 mel. uttering STrill's. It is 1/2 grown young. Quite independent.

Band gradually moves off. Stop vocalizing when they get some distance from us. (All to still making noisy movements) Then start to utter more MGB's and STrill's when we catch up

with them again.

Kite still with group.

There is at least 1 quite small (but independent) "infant young" with group.

8:15 a.m. Group seems to have become used to us (again) now. Almost completely silent. Only very occasional SAll.

Then we get closer, and there are more MGB's and MGB-AlB's)

SAll's apparently continuing at semi-regular, infrequent intervals.

SAll's certainly being uttered by young of different ages, ¼-½ grown. Probably being used to let parents know that they are still around.

8:25 a.m. Now hear soft, long, rather "wavering" "MOB"s being uttered. By mid. near young? A real M pattern ???

One mid. (adult?) makes definite escape int. mov. when it utters single AlB.

Then another mid. utters AlB's. Gradually change into "semi-Q"s (i.e. become higher and sharper). Ind. retreats (from us) about 10 ft. Performs silent Jud! Relaxes !!!

Then hear some rather long, harsh B-type noises. Inds. squabbling over food? I think so.

Then see infant moving along branch. Followed by adult. Presumably Q. Infant eventually jumps on Q's back. No obvious reaction. Both silent. Q sits down. Licks fingers. Moves on. Still carrying infant on back.

Cebus capucinus, Sept. 14, 1966, III

8:50. Kate still with group.

Animals apparently quite undisturbed by us now. But still uttering occasional noises. Single short B's of various types. Mostly MOB's — with emphasis on M. So species may not be completely silent "under natural conditions".

Then hear a few more long, hoarse B-type sounds. The bird that sound as if they were being uttered during a dispute. I shall call these "Roar-B's". Altho they obviously are at least partly intermediate between typical Screams and "typical" B patterns.

Then more "M-type" MOB"s. Actually some of these are almost or completely pure (& brief) M's. No guttural quality at all. Obviously low-intensity. Possibly just low-intensity versions typical MOB's. More probably Cebus hostile.

S-Bill's also still continuing pretty steadily.

Then come across group 2-3 young. Various ages. 15 ft up in tangle. It is these inds. which are uttering all or most of the "M"'s. Some apparently directed toward us. But most apparently directed among themselves. 2 adults 10-20 ft away are silent!

9:04 a.m. Now all inds. silent!

Then brief M's and S-Bill's start again.

The part of the group near us now seems to be composed exclusively of young. Adults seem to have gone on ahead.

9:11. No reaction to Roaring of Howlers in distance. Neither sound nor movement.

Cebus capucinus, Sept. 14, 1966, IV

9:20 a.m. Sub-adult pulls and pushes vigorously at branches. Also knocks one branch against another. Obviously, at least partly hostile to us. Silent. Little or no facial expression.

Kite still with group 9:28 a.m.

Then I go on to what seems to be front of band. 10 or 12 adults. Quite silent!

Adults probably are much quieter, on average, than young

Then hear some L Trill. Can't see who is doing it, or why. Quite brief. Not accompanied by other sounds.

Then a whole burst of CCCB-S's. Very contagious. Followed by Screams and L Trill's by one ind. Fight???

Then all peaceful again.

Shortly after this, all or most of band moves off rapidly and silently. We lose them!

Find them again 9:53. Burst of MOB's and brief M's as we approach. Then everything quiet. Then hear a few ambig noise sounds which may be single BB Notes.

Then notes were uttered just after Oppenheimer threw bread on ground. According to Oppenheimer, double BB Notes can function as "summons" (cf. H of Cotus and W of Saguinus!!!!!!) But these single notes don't produce any obvious effect.

Then 1 juv. comes down to get bread. Utters M's and/or MOB-M's descending and ascending. But silent on ground itself.

10:15 a.m. "Mid morning rest period." Adult ♀ groom

CEBUS CAPUCINUS

I

Cebus capucinus, I

September 27, 1958
Barro Colorado

The Howeyaes (Per Hoot et al) got a Capuchin a couple of days ago, and are keeping it on the island. Cl 07. Probably (?) not quite full grown (the dealer said 6 months old). I have been watching its behavior a little.

It does not seem to clean its face by rubbing it along the ground or a branch like the pitche's and Night Monkey. Seems to use its tongue or its hands instead.

It has a variety of calls — the commonest of which seem to be variations on a single theme — which I shall call the "Mean Grunt" or MG. Most MG Notes might be transcribed as "Cuh" or something similar. Notes always emotionally single, but frequently, even usually, repeated. Some of them are quite plaintive. Some of them harsher & more grunt-like. All obviously hostile, I think. Usually provoked by, and directed toward, human beings in the case of this capture specimen. The harsher more grunt-like MG's are possibly more aggressive than the more plaintive types. More often given when this captive animal looks as if it were likely to bite.

MG's are the usual response given by wild Capuchins in the forest when they become aware that a human being is nearby. More often, I think, the harsher kind than the plaintive kind, (and the wild Capuchins around here are really quite aggressive).

I rather imagine that the MG of the Capuchin is roughly

homologous and analogous with the Q Notes of the pitche's and the Glp's or SNG's of the Night Monkey (it is more probably analogous to the Glp's — although it sounds more like the SNG's.)

When pulled up in the hand, the captive Capuchin gives loud screams. Quite human-sounding, and not unlike the obvious homologous scream or wail of the Night Monkey. Also obviously homologous with the K of the Pitche's.

The captive specimen also sometimes gives a weak squeak-like single note (Sqn). When it approaches a human being without much evident hostility (no aggression) this might conceivably be a weak, even "friendly," modification of the MG-Note, (it sometimes gives the impression of being a "stifled" MG-Note).

The captive animal also frequently utters a high-pitched squeaky but rather soft twittering noise. I shall call this TW. Rather like a soft version of the TW of the Pitche's, but with more "vibrations" or "semi-syllables" — more like the Trill of the Pitche's might. It might even be homologous with the Trill (and/or TW ??) of the Pitche's. Apparently given when the animal is alarmed or nervous by a too close human approach.

Some of the MG's are accompanied by "puckering" of the lips. I shall call this P. Relatively rare. Apparently high intensity. Only given with some of the loudest MG's. MG's which may be on the grunt-like side, but are not, I think, the most

extremely grunt-like.

This P is the only thing I have seen which might be considered a display movement.

Cebus capucinus, I — September 28, 1958
Barro Colorado

I only watched the capture Capuchin for a few moments today, but I did notice a few things.

He can do P without any vocal at all. In fact, he did it a lot of times within the few minutes I watched. What does this suggest about its motivation. Lower intensity than P+MG ??? Containing a weaker escape element ????

He also has another vocal related to MG (again it may only be a variant). A long drawn note "Aaaarrrrh" More guttural than other MG's. Most like the grunt-like types. Can't say much about its causation, but it sounds as if it might be rather high intensity.

Cebus capucinus, I — October 3, 1958
Barro Colorado

We put the capture Capuchin in with the 2 Spider Monkeys for a couple of days. He didn't do anything new or interesting in the way of behavior, maybe because the Spiders absolutely refused to react to or with him; but I should mention that once, when the L Spider knocked him off his perch, passing by in a hurry,

the Capuchin uttered a particularly long TW, quite Trill-like
Would seem to confirm that the TW is hostile and contains
a fairly strong escape component.

Cebus capucinus, I October 16, 1958
Barro Colorado

I haven't been paying much attention to the captive Capuchin recently, but I have been struck by how much its vocal repertoire of patterns resembles that of the Spider Monkeys. Perhaps the patterns are exactly equivalent.

Capuchin		Spider (Black)
"Squ"	=	"O"
"TW"	=	"Trill"
"MG"	=	"B"
"Scream"	=	"Scream"

I think that I shall call these patterns "Squ", "Trill", "B", and "Scream" in both species from now on.

Cebus capucinus, I November 13, 1958
Barro Colorado

Before I left on vacation, we put the Capuchin in the large cage with the Panama Peniche's. When I came back, I found the situation rather changed. The Capuchin had become shy-er; and he had adopted, and been adopted by, the very

young Pucker, H, who spent most of the time riding on the Capuchin's back.

The Capuchin definitely seemed to have acquired a parental attitude toward H. H sometimes got off and ran around by herself. Then, whenever I moved and the Capuchin became alarmed, he would rush up to her and she would jump on him, and he would then run away from me. At least twice, when he approached H in such situations, he uttered a Trill Note slightly different from the usual weak Trill he utters when just mildly alarmed by himself. Much less whistle-like. Deeper, (perhaps "hoarse" ???), more wooden a mechanical sounding. I shall call this the "C Trill." It looked as if it might be a definite special call to summon the young in times of "danger".

I am rather surprised by this behavior on the part of the C Capuchin, as I presume that the ♀ usually carries the young in this species.

Later today I separated the Capuchin from H, and recaught the Capuchin & put him in a cage by itself. As a result of all this activity, I think that I have a much better understanding of the Capuchin's hostile repertoire. It is obvious that both the "B" and the "Trill" are really complexes of patterns, and they should probably be divided.

The lowest intensity form of B is the weak and rather plaintive sounding "MG" type. I shall call this "MGB"

The MGB is the usual form of B given by the animal moving about the cage in a not-too-excited manner when I am sitting outside. Often alternated with the ordinary weak full. Often associated with slight PL, the PL occurring during the actual utterance of the notes as well as between notes.

An apparently higher intensity form of B are longer, deeper, rather hoarse, not-at-all plaintive notes, which appear to be almost bisyllabic (sometimes almost trisyllabic?) Might be transcribed by something like "Ooooaah". Each note eventually single, although, of course, frequently repeated. I shall call these notes BB. They are also frequently associated with PL, in the same way as MGB Notes, but the PL associated with BB is much more extreme, morphologically, than the PL with MGB. The BB Notes are characteristically given by the animal when he is moving about the cage rather "nervously" when I am sitting inside (quietly, without much movement). It is possible that the BB Notes are produced by a relatively stronger escape component than the MGB.

Another form of B are sharp loud hoarse notes, similar to the BB in quality but much shorter, more explosive sounding, and quite monosyllabic. Real barks in fact. I shall call these ABB's. They seem to be given when the animal is greatly alarmed. He gave a lot of them, for instance, when Boca (of whom he seems to be frightened), appeared in the dirt-

ance. Almost always accompanied by violent running away from the disturbing stimulus; so must be produced by a relatively strong escape component. (I am not sure what, if any PL is associated with alB Notes, but I think it must be similar the same as the PL associated with BB.)

When I went into the cage to chase the H Pinche' (to separate her from the Capuchin before catching him), the Capuchin was mildly excited and apparently very, very frightened (as I was running madly around the cage), and I noticed that he gave alB Notes, "B-Trill's" (see below), and Screams; and the alB Notes & Screams seemed to intergrade. The Screams are rather similar to BB and alB Notes in tonal quality, just longer (& more irregular in length); and so I think that the Scream must be considered a member of the "B complex", probably the highest intensity form of B. Some of the Screams may be more aggressive than alB Notes, as they are accompanied by biting, when the animal has been caught and is screaming in human hands. Even the animal is running about freely, the screaming is always done with mouth wide open (apparently not opening & closing when a series of screams is being uttered).

When I was chasing H, I noticed that the Capuchin uttered a lot of notes which appeared to be intermediate between B Notes and Trills, in addition to alB Notes & Screams. There were much like short Screams in tonal quality

but are definitely quavering. I shall call these B Trills.

It is also my impression that the Capuchin uttered a few "pure" Trill's during the same incident. Sounded much like the P Trills but even louder. Perhaps the highest intensity form of "pure" Trills. I shall call them "J Trills".

I am not sure exactly how the motivation of the "Trill complex" as a whole differs from that of the "B complex" as a whole. I thought that the ordinary low-intensity Trills were produced by a relatively stronger escape component than the MGB's, and it is possible that the higher intensity forms of Trill differ from the higher intensity forms of B in the same way. But the AlB's seem to be such a strongly alarm pattern that I am beginning to wonder. In any case, the problem must be checked very thoroughly.

November 14, 1958

Cebus capucinus, I Barro Colorado

When I went into the small cage where this Capuchin is confined now, early this morning, he was greatly upset and ran back & forth, but was almost completely silent. He only uttered a single MGB. Most of the time he ran around with his mouth wide open, just as during the screaming yesterday, but without any trace of a sound. This would seem to indicate that the opening of the mou-

th and the screaming are really 2 distinct patterns. As I was very close to the monkey this morning, and he was moving about quite actively, the silent mouth opening may be very aggressive than the similar pattern with screaming. It is possible, however, that the silent pattern is just lower intensity (this monkey may have been less excited simply because I wasn't chasing its "child", the H Bride's this morning). Physically, this mouth opening is not unlike the BT of the Red Howler, as the lips are definitely drawn back at the sides (although this does not pull the center of the upper lip to emphasize the teeth). I shall call it BT also.

Cebus capucinus, I. March 31, 1957
Barro Colorado

I got another White face from the Gorgas yesterday. Full grown (much larger than the other White face we have had for so long), supposedly ♀. I shall call this new animal "X", and the one we have had for a long time "A."

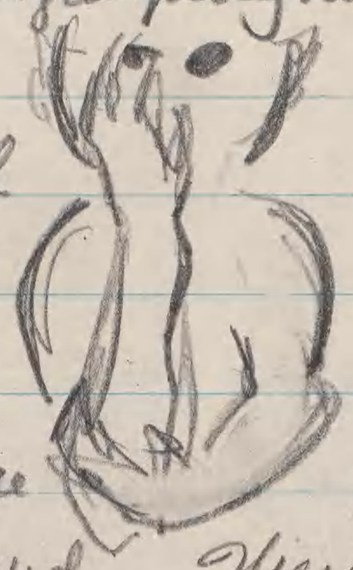
When I got X yesterday, I put it in a cage, in the jeep, and carried it to the office, where it was left outside all day. X was greatly upset by the whole procedure. Obviously with a very strong escape drive. Usually trying to get away from me as far as possible. But it also had some activated attack drive. When I would pick up the cage, it would rush toward my cage, in an apparent attempt to bite (although I was so careful that it never really got a chance to make biting int. poss.) All the time this animal seemed to be greatly upset, with escape predominant, it uttered lots of MGB Notes and a lot of soft Full Notes (the

were apparently identical with the soft Hll's which were the first type of Hll I heard uttered by A – see above.) I think that I shall call these Hll's "S-Hll" from now on. Although X uttered an appreciable number of S-Hll's in its cage, there were definitely much rarer than the MGB's, at least on the average, over any period of several minutes (Surprisingly enough, perhaps, X did not utter any BB or "al"B notes in its cage yesterday. The only other sounds I heard it utter at any time yesterday were screams, at the Gorges, when the keeper was chasing and catching it.)

Another reaction of X in its small cage yesterday was even more interesting. A definite form of Hdd. It would sit, more or less hunched up, looking at me intently, with its tail usually curled around up, in front of its face and back over its head. In this way, the tail usually covered the mouth, but seldom or never the eyes. I am sure that X was still greatly alarmed whenever it assumed this Hdd posture, but it was apparently always quite silent as long as it remained in the posture. This whole posture was most reminiscent of the Hdd of the Squirrel Monkey – see today's notes on Saimiri. (Incidentally, as far as I can recall, Cebus & Saimiri are the only American monkeys I have seen which ever sit with their tail brought forward & up in this fashion.)

As a variation in this Hdd pattern, either in addition to or (more frequently ?) instead of putting the tail over the face, X would raise its hand and hold it in front of its face. The hand usually spread, palmar surface toward the face, backs of the hand toward me. In its small cage yesterday, X usually just lifted one arm when it put its hand in front of its face (which I shall call "HL"), but sometimes it "propped" the arm which was lifted by raising the other arm

a little and grasping the first arm in the region of the elbow.



← this sort of effect

It all looked remarkably coy. Most of the time, yesterday, X first held its hand in front of its face during HL, but sometimes it also licked or bit gently at the surface of the skin, & frequently, the back of the forearm first below the raised hand. These licking and/or biting movements were apparently identical with ordinary grooming movements. They look as if they were "displacement" in this situation, but they are of course probably purely autochthonous reactions to seeing the hand & forearm held in front of the face. "Postural facilitation".

We put X in the large outside cage today, with A and the three Squirrel Monkeys. Quite a lot of interactions between all the animals, which I had a little difficulty following. The general sequence seemed to be as follows.

When X was first put in, it was obviously quite alarmed & upset still. The usual nervous exploratory behavior. Accompanied by more MGB's and SFill's.

The three Squirrel Monkeys and A were also much alarmed at first, moving about nervously in the far corner of the cage. A was also uttering a lot of MGB's and SFill's.

In the cases of both A and X, again this morning, the MGB's were always much commoner than the SFill's.

After about ½ hour, the 2 Squirrel Monkeys were gradually overpowered by their curiosity and gradually started to approach X. X resented this very strongly. Repelled them by making "grunting" BT's, and, usually, leaping toward them, with obvious bit movs. of

hitting and/or stutting at them. This BT was obviously the same as the BT I have seen before, and I got a rather better look at it this time. The corners of the mouth are drawn very far back, and up, so that the whole thing looks like a parody of a human smile. I can confirm that the teeth are not prominently displayed by this pattern. This BT is obviously aggressive, and I think quite high intensity. It may be lower intensity than the Scream, or (more probably ??) just more aggressive.

X eventually stopped doing this, and spent the remainder of the day apparently ignoring both the Squirrel Monkeys and A. Still uttered a few MGB's and SoHH's. Also did a lot of sitting in Hdd, usually with HL. I think that all these latter patterns may have been provoked by my presence. The HL today appeared to be accompanied by even more chewing and/or biting than the HL yesterday. This would suggest that more of the grooming today was more normal, less inhibited by hostile motivation than most of the HL yesterday.

All the BT and probably all of the Hdd and HL by X today were quite silent.

Unlike yesterday, X sometimes performed HL without Hdd. It sometimes ran along a branch using the two hind legs and one front leg, keeping the hand of the other leg in front of its face as it ran.

I presume that both the Hdd and the HL are produced when the escape drive is stronger than attack. Quite possibly when the attack drive is actually almost minimal. It is possible that they could both be considered almost pure escape or alarm behavior. Although I don't know why an animal sometimes performs Hdd, with or without HL instead of actual running escape movements. Partly just due to external circumstances. May occur when actual escape is physically

impossible. I don't think that the Hdld and HL can be very high intensity patterns probably produced by much the same range of motivations in other species. I don't know what the motivational difference, if any, can be between the Hdld and HL patterns themselves.

A gradually overcame his alarm, to some extent, and by late afternoon he was making constant attempts to approach X. Slow, cautious angular approaches & circling movements, interrupted by lots of little panic flights back a couple of feet or so. All these approaches were accompanied by lots of BT. Also a relatively small but actually appreciable number of sharp sounds which sounded very much like the S of the Panama Pitches, and even more like the S of the Squirrel Monkey. There were sometimes given while A was actually approaching X, but more often (I think) when he was at a temporary "standstill", when he was standing or walking or running on a branch a few feet or a few yards from X but not actually approaching it to any appreciable extent. Interestingly enough, when A started these BT- & patterns he almost completely stopped the MGB-SFill patterns. The BT- & patterns are obviously relatively much more aggressive than the MGB-SFill, and I suppose that the BT is more aggressive than the S. (None of the patterns by A seemed to provoke a response by X at any time. X just sat ignoring A.)

An interesting reaction by X yesterday, which I forgot to mention above, was lateral shaking of the head ("Lsh"). This tended to occur whenever I looked at it intently (and possibly occasionally at other times). Sometimes silent. Sometimes accompanied by MGB. Sometimes accompanied by SFill's (perhaps most commonly?). Rather reminiscent of the SF of the Pitches, and the shaking of the head

during the Say's of the Squirel Monkeys. (Although I think that the head was shaken from side to side several times during this Sch, which is not, I think, true of the SF of the Panche's and possibly not true of the movement during the Say of the Squirels.) This Sch also appeared to be a pattern produced by a preponderance of escape drive, but I am not sure how its motivation differs from that of the MGB and the SFdl. I am also not sure if it is strictly homologous with the SF, etc., of other species or not.

Surprisingly enough, A only uttered one BB all day today; and this occured in not very illuminating circumstances.

A didn't perform any Hdl at all today. And only once did he run along a branch with HL. The rarity of these patterns in such circumstances is certainly significant — but of what ???

At one time today, A interrupted his concentration on X when one or more wild White-faces appeared in a tree about 100 or 150 yards away. Ran to the corner of the cage nearest them, and paced back and forth excitedly, uttering a lot of loud Trill's (these are the sounds I called "Trill"s above, Nov. 13, 1958, p. 8, but I think that I shall call them "L-Trill"s from now on?). I think that A may well have been alarmed by the appearance of the wild White-faces, although he showed no trace of a desire to escape to corners of the cage furthest from them (and they showed no trace of a desire to approach the cage — at least while I was there). A certainly didn't do any of the aggressive BT-S patterns while he was waiting to the wild animals.

In general, today, I was struck by the resemblance of quite a lot of the patterns performed by White-faces to patterns performed by

Cebus capucinus, Mar. 31, 1959, ~~VIII~~.

Squirrel Monkeys (and, to a lesser extent, to patterns of Pericle's & Tamarins). The White-faced & Squirrel Monkeys also seem to be very similar to one another in having a comparatively large number of vocal patterns.

Cebus capucinus, I. May 3, 1959
Barro Colorado

Walking in the forest today when we came upon a large band of White-faces, moving more or less along Lutz Stream, feeding as they went. Surprisingly enough, many of the animals fed along the ground, picking up a variety of fallen fruits. Seemed to be quite happy on the ground except when we scared them; and some of them continued to feed on the ground even when they were slightly alarmed by our presence.

I noticed another band of White-faces feeding on the ground near the end of Van Tyne trail a couple of weeks ago. In general, it would seem that this species is not at all reluctant to leave the trees when necessary or desirable. These animals certainly seem to be agile and rapid while feeding on the forest floor. Quite as efficient as coatis in the same circumstances.

The animals in the band today repeatedly became alarmed and/or irritated when we came very close to them, or they came very close to us, but they were really quite tame, and we were able to follow them at a slight distance for several hours without causing them into a major panic. From approximately 2:00 pm to 4:00 p.m.

I was generally surprised by the calls they made. Relatively little MOB or BB; but a lot of rounds of sounds, and related patterns, which were most reminiscent of the Pericle's.

These White-faces did not appear to be very greatly frightened, even when they first discovered us (they ran into us, rather than us running into them). Quite in- stated. Most of the animals which were on the ground ran part way up trees when the band first reacted to us, but quite a number of animals either stayed quite low, or returned to the ground, or never did leave the ground, and many of these "low" animals displayed at us vigorously.

The most common display of all the monkeys, in the trees or on the ground, throughout the period we watched the band, was BT. Usually silent. It seemed that no monkey could look at us without doing BT. It is obvious that the bright intense forms of BT are those with the lips drawn furthest back at the sides. This type of BT is apt to be accompanied by vigorous "Jud-ing" (see below) and occurs in close association with Q and related calls, while BT without the mouth drawn back at the corners (mouth just open like a goldfish) is usually performed by animals who don't do other displays and seem to be very little excited in general.

The next most common "display" was the usual straight-legged jumping up-and-down. I shall call this "Jud" from now on. This was performed by birds on the ground, who couldn't break off branches as well as by birds in the trees. Almost always accompanied by BT, and frequently combined with Q and related noises, (see below).

The most common calls were single Q Notes. These seemed to be inherently the same as those I have heard uttered by captive animals. I was particularly struck by their resemblance to the Q Notes of the Pitche's in actual sound. Just a little deeper, a little less sharp, and perhaps a little more irregular.

These Q Notes were usually uttered singly, or perhaps in series of 2 or 3 notes with definite pauses of considerable, irregular, length between

successive notes; but the annuals occasionally uttered more complex calls which seemed to be series of 8 notes uttered much more rapidly, without appreciable pauses between the notes. Sometimes gave a sort of "bubbling" effect. Very reminiscent of the TW of the Peniche's!! I shall call this pattern 8TW in this species. Usually or always included at least 4 notes, sometimes more, perhaps a lot more in a few cases.

Both the 8 and 8TW were usually or always accompanied by some trace of BT, I think. Or rather, the annuals which were doing BT before continued BT while they gave 8 and/or 8TW, and continued to do BT afterwards.

Both 8 and 8TW were usually or always combined with Jud also. And they were also combined with other obviously aggressive movements as well. The normal sequence of events was for an annual which had been looking at us for some time with silent BT and perhaps some trace of Jud to suddenly, while a few feet close to us, stop, and perform extreme Jud, uttering 8's and 8TW's as it walked forward and did the extreme Jud. This type of behavior would seem to indicate conclusively that both the 8 and 8TW are quite aggressive.

Both the 8 and 8TW (the 8TW possibly even more than the 8) were quite remarkably contagious. Whenever one bird would start these calls one or more of the other annuals in the neighborhood would usually start them too. And the most interesting aspect of the contagiousness of these patterns was that the other annuals which responded by giving 8 and 8TW also usually ran closer to us as they gave the notes and performed particularly vigorous Jud. The sound of the 8 and 8TW, in other words, seemed to stimulate the "general" aggressiveness of the annuals which heard them, and may have actually "orientated" their aggressiveness for them!

I am not sure what the causal differences between the 8 and 8TW may be. It is possible that the 8TW is just higher intensity than the simple

♂ alone.

The annuals also uttered a few single notes which were slightly different from the typical ♂ notes. Probably partly intermediate between ♂ notes and one of the B-type notes. I was struck by the fact that some of these intermediate notes sounded very much like the "chuck" notes of Callicebus.

The ♂ and ♂TW performances we heard today almost all occurred during the first half of the period during which we watched the band. Presumably after the annuals were not used to us. Stopped later on, presumably when the annuals became conditioned

I heard a few Trill's (probably rather soft) uttered even during the first half of our observations. Apparently uttered only by young & immature annuals (which uttered few or no ♂'s or ♂TW's).

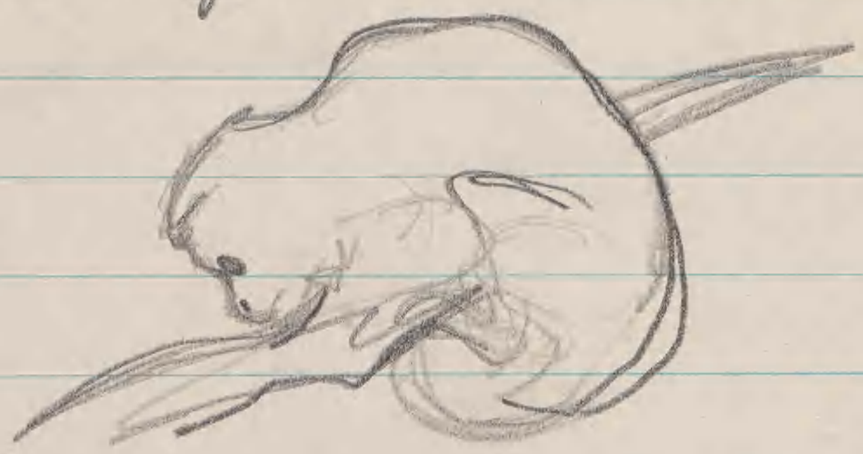
During the last part of our observations we heard only Trill's and MG-B's. I am not sure why we heard no way of these at that time. Possibly because by that time we were watching a part of the group which was made up of immatures alone or immatures with only a few scattered adults among them. In any case, it was interesting that during this period none of the annuals uttered ♂'s or ♂TW's or rushed at us in a particularly aggressive way. The only aggressive patterns at this time were BT, which was still quite common, and some Jud, which was less common and usually not very vigorous on the whole. This would suggest that both the BT and the Jud are lower intensity and/or less aggressive patterns than the ♂ and ♂TW.

Several annuals uttered single "sneezes" during the period when ♂ and ♂TW were particularly common. I did not hear any more sneezes after the ♂ and ♂TW, which might suggest that the sneezes were display of some sort; but unfortunately I was never able to see the annuals which were sneezing.

Cebus capucinus, May 3, 1959, V.

After the animals had become used to us, we saw a little mutual grooming. Probably among the sub-adults or miniatures (although quite well-grown). Nothing of really great interest. The animal in the grooming sat of curled up on a branch

More or less like this



One of the animals which had been soliciting grooming a few minutes before was the object of what appeared to be a cop attempt. Just sitting quietly when another animal (perhaps the one which had been grooming it before) ran to it, leapt on its back, and performed some movements which I am almost sure were pelvic thrusts. Very brief. Too far away to tell if it was successful or not.

Several other miniatures also engaged in "playful" wrestling. Apparently quite silent – unlike the Squirrel Monkeys. (But I was quite some distance away from the animals

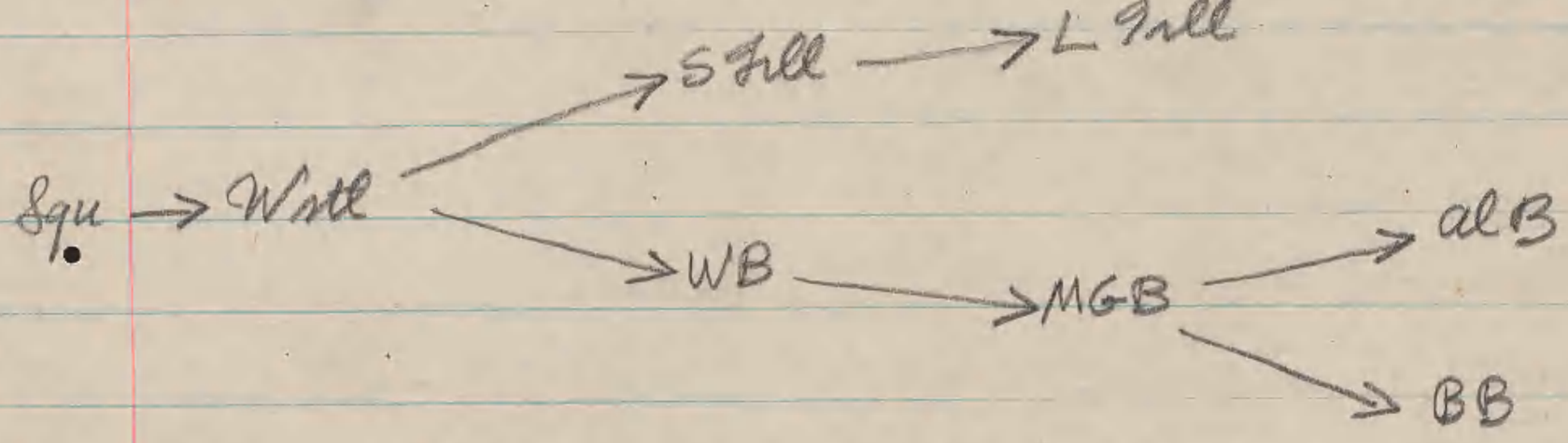
Cebus capucinus, I. June 13, 1959
Barro Colorado

I got a new White face in the market yesterday. ♂? Fairly young (perhaps ⅓ grown ?). I shall call this animal "E".

He is not really tame yet. Moves about nervously when I approach his cage (he is in a small wire cage with the young Howler "Y"). But I can sometimes touch him, quietly, with my hand without getting bitten

And, when he is put on my shoulder, he can be persuaded to stay there - although reluctantly.

I have been studying his calls almost all day. I now have a pretty good idea of what his repertory is. I shall have to re-order my previous ideas a little, but not too much. The notes he has uttered today might be represented by the following diagram:



(This probably is not the whole repertory he is capable of producing. He must be able to utter Squeaks, if nothing else — and probably a lot more.)

All the sounds I uttered today were obviously restricted to particular circumstances; so I have a very good idea of what their motivation must be (I am, in fact, almost convinced that I have solved all the problems connected with these particular calls).

The first group of patterns might be called "the Squ-Whtl Complex." My previous descriptions of these patterns were pretty good. All these patterns are fairly soft whistle-like notes, some short (Squ) and some long (Whtl) apparently connected by a complete series of notes of intermediate lengths. Obviously relatively new [illegible] given by the animal when I wasn't too close, or, at least, he didn't seem to be reacting to me very vigorously - not not moving around his cage very actively or very rapidly (As soon as I did come closer, or he began to move about more rapidly, the Squ-Whtl

patterns were largely replaced by Trill and/or B patterns.) Either general frustration or (more likely, I think) weak bowelsby (in any case, certainly not aggressive). The longer notes are generally just higher intensity than the shorter notes. All uttered with mouth closed or almost closed. Seldom or (more probably) never arc, RL.

The longer notes of this complex, the Will's, sound quite remarkably like the Will's of Celeus castaneus! I don't think I could distinguish these notes of the 2 species by sound alone!

The second group of patterns may be called the "Trill Complex". Much as described above. The sound of the Trill's varies from thin weak, whittling Trill's (which I shall call "S Trill's"), which sound very much the same as (and are perhaps indistinguishable from) the S Trill's of Celeus castaneus and many other species, to loud "rattling" wooden-sounding Trill's, quite like the L Trill's of Lagothrix in sound. (I shall call these louder Trill's "L Trill's" too. They are almost certainly the sounds I called "P Trills" on Nov 13, 1958, p. 5, and "T Trill's" on p. 8 of the same day). The behavior of this E animal today would tend to confirm my earlier hypothesis that the Trill's of this species are alarm patterns, or, at least, produced when the escape drive is slightly dominant. E definitely tended to make little retreat movements or intention movements when he uttered Trill's, and tended to utter Trill's whenever he seemed to be particularly "nervous." I think that the L Trill's and S Trill's of this species may intergrade completely. Probably differ only in intensity — the louder notes being higher intensity.

All the rest of the calls of the species may be considered to fall into a "B Complex". The constituents of this complex uttered by E today were quite clear. Including WB, MGB, aB, and BB

The WB patterns were the most surprising. Sometimes I observing or-

orlooker in this species. Quite reminiscent of C. apella in actual sound. One or a few notes. Quite variable. Most could be translated more or less as "Wheeeoo." In the case of E today, however, it was obvious that the WB is only an imperfectly segregated intermediate between typical WB's and typical MGB's !! Seemed to intergrade with both the latter notes to a quite appreciable extent. A few WB's were a little quavering —

It was my impression that these WB's were mildly hostile and/or provoked by somewhat thwarted gregarious or infantile motivation. Certainly not usually accompanied by obvious overt attack or escape intention movements.

All or most of the WB Notes of E today were accompanied by some slight P2. Very slight with mouth open only very slightly.

The WB's were certainly the most common of the B Notes uttered by E today. Again reminiscent of apella.

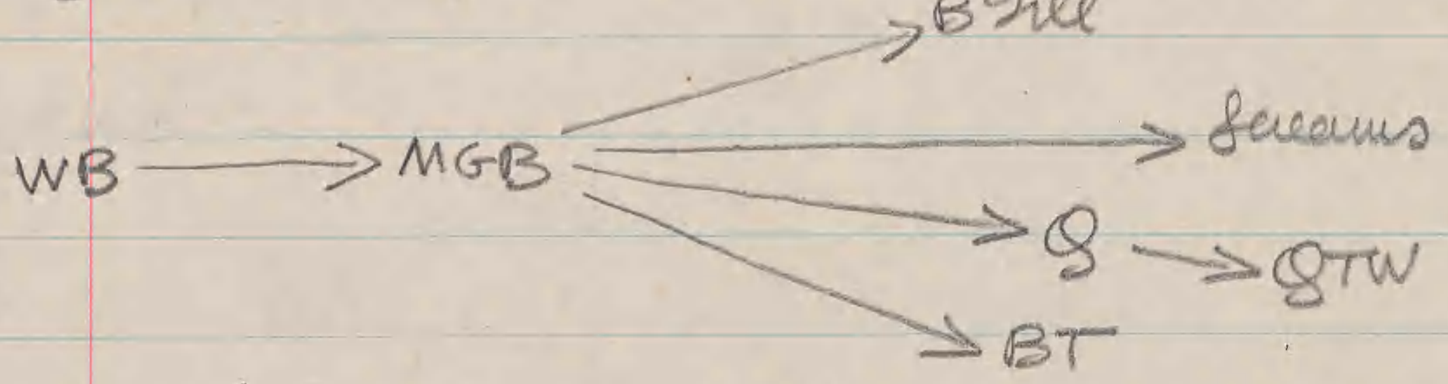
The next most common of the B Notes were MGB's. Sounded just like the ones I have heard many animals utter before. Usually or always accompanied by a moderate amount of P2, with mouth moderately open. Here appeared to be just high intensity WB's — in some sense at least. Probably just more strongly hostile. Attack & escape probably nearly evenly balanced. Seldom or never accompanied by much in the way of overt attack or escape movements.

Both the AlB and BB Notes were much rarer. Again sounded just like the notes I have heard previously — and accurred in very similar circumstances. The BB is obviously more aggressive (and higher intensity ??) than the MGB. Usually or always accompanied by a slight trace of Jud. The AlB is at least something of an alarm note. Less aggressive (and higher intensity ??) than the MGB. E tended to give a series of AlB Notes when he saw some new and unfamiliar approaching in the distance.

I think that E's AlB's notes were accompanied by the same type of P2

as his MGB's; but his BB's were certainly accompanied by more extreme FL with mouth quite widely open.

Although the relationships of other B patterns are clear, they are a little difficult to connect with other related patterns I have heard (although other animals. Perhaps the relationships of all the B and related patterns (of both adults & juveniles utter the same range of notes) might be represented by the following diagram:



E also did some recent BT this morning. Just before he tried to bite me. It is obvious, I think, that BT can be provoked by quite a wide range of motivation, varying from quite strong to quite weak, as long as the attack drive is strongly predominant. E did BT before bill and not very vigorous attempts to bite

Once or twice, when E was sitting rather unhappily on my shoulder, he made definite "Chewing" sounds !!!

He only did one Fish today — when he seemed to be moderately upset or excited by my approach. Gave WTT just before and as he did the Fish, and an L-Trill immediately afterwards.

Colius capucinus, I. June 14, 1959
Barro Colorado

E behaving much as usual today.

Cebus capucinus, Jan. 14, 1959, I

The only new thing I noticed today was that he tends to do chewing immediately after a period of violent hostile excitement. Today, for instance, he ran away from me and I had to catch him with my hands, thus provoking all sorts of frightening & biting on his part. Then I put him on my shoulder and he gradually calmed down. It was then that he did chewing. All this is most reminiscent of young Howlers

Cebus capucinus, I June 24, 1959
Barro Colorado

Yesterday I brought back three White faces from the Gorgas. Two ♂'s and one ♀, all apparently fully adult. I let them loose in the large outside cage where my other two White-faces have been for a long time.

I was rather disappointed in the general reaction when I let the three new animals loose. Less excitement and behavior in the cage than I would have expected.

When I first approached the cage with the three new animals in their travelling box, one or both of the old monkeys uttered a few 8's. Surprisingly enough, these 8's appeared to contain a relatively strong escape component, almost like alarm calls. The monkeys were running about their cage, in apparent attempts to escape, when they uttered these 8's. And the 8's were gradually preceded by ABs (like the ones described above) as the animals seemed to quiet down a little.

When I let the three new animals go, all or most of the five animals uttered a few 8's which also were preceded by ABs as the animals quieted down a little.

This behavior, in conjunction with my previous observations of 8's

might suggest that the ♂ ci eventually a very high intensity pattern, in which either attack or escape may be predominant at different times.

If the ♂ should, however, to be always produced when the escape drive is relatively strong, then it would be strictly comparable to the ♂ of the Pygmy Marmosets. I wonder ????

Four of the animals uttered a few typical ♂ Notes, followed by a few typical (i.e. monosyllabic "aba") aBB's, and then shut up for the rest of the session. One of the new animals, however, gave a few ♂ Notes, and then quite a lot of typical monosyllabic aBB's, and then a great many notes which were entirely identical with typical aBB's except for the fact that they were definitely bisyllabic "aba". I shall call these bisyllabic notes aBB. The animal continued to utter aBB's almost uninterruptedly, for at least a half hour, as long as I continued to sit near the cage! The behavior of this animal would confer in the hypothesis that the aBB is produced by weaker motivation than the ♂, and would suggest that the aBB is produced by weaker motivation than the aB.

The behavior of this animal who uttered so many aBB's while the other animals uttered none is another indication of a distinctive aspect of the White-faces' behavior of which I have just gradually become aware. The intraciqil patterns of White-faces seem to be much more variable than those of any other monkeys I have studied (with the possible or probable exception of Ateles).

Another example of this variability is provided by the old ♀ X. She continues to perform a very great deal of HL, but none of the other White-faces I have watched have ever shown the slightest trace of HL!!! (although they may do a lot of ordinary-looking scratching when obviously "upset" or "nervous"). The form of X's HL has remained quite the same as before, and she continues to perform whenever I approach the cage. aBB

this Coolie very much as if X had "learned" a ritualized pattern all her own!

There were also a lot of ordinary Sfill's uttered by 2 or 3 or all the animals when I let the other new ones in with the old. Not obviously associated with any helpful overt behavior. But twice, the young ♂ A very cautiously and slowly walked up to one of the new-animals and stretched his head & neck forward til he almost touched the new-animal with his nose, perhaps actually sniffing the new-animal, and uttered several mummally loud Sfill's each time it did so. A looked very "longing" as he did this, as if he very badly wanted to cuddle up to the new-animal but was afraid to do so. This might suggest that the loud Sfill's of this species are similar to those of all or some other species in being produced by frustration of some filial or gregarious motivation. The loud Sfill's uttered by A in these circumstances were presumably the same as those I have called "T-fills" and "L-fill's" in the preceding pages. Much louder than ordinary Sfill's, but otherwise quite similar in quality — not deeper in pitch or wooden or hollow-sounding. I shall continue to call them L-fill's.

A few of the animals did BT in the normal way in the usual circumstances. Always or usually silent.

All or most of the animals also uttered one or two brief moan-like notes from time to time. Very difficult to interpret as not obviously associated with any very particular type of overt ritualized behavior. Possibly just abbreviated MGB's, but it was my impression that they were more plaintive sounding than typical MGB's. Possibly a form of "M"???

Sometimes, when one of the new-animals would lunge at, or approach too close to, A, he would jump back an inch or so and utter two or three brief notes very rapidly. Definitely "twittering" in effect. This may well have been a form of QTW, but the notes were quite pure and high

CEBUS CAPUCINUS

II.

pitched, clic Squ Notes w/ quality, without the slightly hoarse quality which I think was characteristic of the QTW I heard uttered by the wild White-faces in the forest. It is possible that these "QTW"s of A contained a stronger escape component than any I have heard before. Or they may have been just the juvenile form of the call.

Cebus capucinus, I. September 16, 1960
Barro Colorado

Walking along Barbour Trail when we came upon quite a large troop of White-faces in high trees, just to one side and partly overlapping a band of Howlers. Unlike Carpenter, I have been struck by the great frequency with which these 2 species associate with one another on BCI. Is the difference between my observations and Carpenter's due to the fact that the forest is more mature now?)

These birds were not very vocal. One or more birds uttered QTW and Q when they first saw us. Then fell silent within a few seconds. Some minutes later, one animal (almost certainly not the one who uttered QTW and Q) uttered MGB's and Trills (twice in relation here).

Then several of the animals uttered AlB's and MGB's when there was a brief burst of Howling by the Howler Monkeys. But again the White-faces fell silent almost immediately. From then on, they seemed to ignore the continuing uproar among the Howlers for the rest of the period (approximately ½ hour) we stayed to watch them

Cebus capucinus, I. October 1, 1960
Barro Colorado

I have had 6 adult and sub-adult White-faces in a large outside cage for months now. Only a couple of these (and I don't know which ones) are the same as the ones I kept last year.

This morning, at 10:00 a.m., we introduced a 7th animal (perhaps a little more than half grown) into the cage with the other 6. I shall call this new animal Φ. (It was caught on the island about 3 days ago, and then kept in a small cage in the animal house until today. Seemed to have become quite tame.) I think Φ may be ♀, but I am not sure.

Φ uttered burst of ALB's when first let into the cage with the others, as it ran straight to corner. Sat there.

The others didn't pay nearly as much attention to it as I expected. At first just uttered a few MGB's, as they ran more or less normally around the cage. Then MGB's with probably reactions to my presence.

Then three of the old animals walked over to Φ, peering curiously at it. One probably made an attempt to SNF, face to face, with Φ. Then the three retreated a little. Then Φ advanced toward the nearest one, uttering SFills as it did so. The approached animal (adult) immediately sat up on its hind legs, and Φ immediately began to groom the breast & belly hair of this adult. Both SFills and grooming definitely do seem to be friendly. Used for "introductions" (panly appeasement ???).

Then Φ started to follow several animals, uttering SFills each time it did so. Once, when it caught up with one animal it was following, it tried to climb up on the back of the other. Another indication that SFills are friendly — and probably usually essentially infantile!!!

These reactions were interrupted once when one animal (not ♀ or the adult it was following at the time) uttered a couple of AlB's. Immediately all the animals in the cage bounded up to the top, and ran around rapidly for a couple of minutes. This means that the AlB definitely does function as an alarm signal! (A few minutes later, the same thing happened again.)

After being in the cage about 15 minutes, ♀, who was sitting by itself in a corner, suddenly uttered a whole burst of L Trills (very loud and wooden sounding) accompanied by extreme BT. This was obviously provoked by some wild White-faces about 20 ft from the cage. (♀ faced them at the time it uttered the L Trills). This would suggest that the L Trill is a hostile pattern, probably intermediate between the ordinary S Trill and STW.

Then a few minutes later, ♀ became involved in a real fight, with another young animal in the cage. This other young animal was apparently fighting with both ♀ and a wild adult outside the cage, just behind ♀, who was pressed against the side of the cage. In any case, the other young animal was attacking ♀, repeatedly, with its hands. ♀ responded by uttering L Trill after L Trill, with BT. The BT was more extreme during the actual L Trill notes, clearing (not very much, but noticeably) between each successive L Trill note. Twice, in the middle of this intense L Trill-ing ♀ burst into real screams. This whole incident is proof, I think, that the L Trill pattern is very strongly hostile indeed.

There are almost always wild White faces around the cage of these captive animals. This morning, 3 wild adults were around constantly. Most of the time they just ran around, near (and even on top of) the cage, performing nearly constant BT and occasional Jud-ing. Usually quite silent.

Then, for some unknown reason, there was a sudden outburst of more extreme hostility, involving all the White faces both inside and outside the

cage. Lots and lots of ♂♂ and ♂TW, with BT and Jud, by all the animals. In the midst of this incident, the 3 wild animals (on the ground at the time) did something peculiar. One of them suddenly jumped on the back of the other, just like a young animal. Then both continued BT, and occasional ♂♂ and ♂TW, and some Jud, obviously directed toward the captive animals inside the cage, while the one still remained on the back of the other. (I think, from the way they were standing, that the one on the back of the other may still have had all 4 feet (or hands) on the ground throughout all or most of the time it was on the back of the other.) Then the one on the back jumped off, and then jumped back on. Both animals continuing hostile behaviors as before. Then jumped off again. Then the animal who had been jumped on before mounted & jumped on the back of the third wild animal!!! All 3 continued to utter ♂'s and ♂TW, and perform BT and Jud! All this happened within a very few seconds. Then the animals separated, & the burst of extreme hostility died down.

This incident would seem to indicate that jumping on the back of other animals (which I shall call "JOB") is an integral part of the hostile behavior of adults as well as young animals. Not perhaps as strongly an alarm or escape reaction as I thought before. The wild adults performing JOB today were certainly not greatly frightened.

About 15 minutes later, the three wild animals moved back onto the top of the captive animals' cage (after being away a little while). This provoked a little ♂-ing and other hostile sounds by several animals. At this time, after listening to one of the wild animals very carefully, I decided that ♂TW and extreme 2 fills are absolutely identical!!!

After ♀ had been in the cage with the other animals for about 3/4 of an hour, it became engaged in several disputes with another young animal. Possibly the same animal it had been disputing with earlier. But the

ese later disputes were definitely lower intensity and/or less strongly hostile than the earlier one. They began when the other young animal began to approach or follow ♀. ♀ would try to repell it by strutting at it with its front hand(s). The other young animal would respond in kind. (Strutting with the hands is undoubtedly the most common form of not very high intensity fighting in this species.) This mutual strutting developed into very brief wrestling bouts a couple of times, but such wrestling appeared to be almost "accidental" (the animals separated again as soon as possible). Much of this disputing was silent, but parts of it were accompanied by repeated S-Trills. Each S-Trill accompanied by BT. A few S-Trills were uttered by the animal advancing toward ♀, when it wasn't strutting with its hands. But S-Trills were uttered most frequently by ♀ when it was repelling the other animal most actively. At such times, ♀ usually uttered one S-Trill with each forward strutlie of its hand(s).

So the S-Trill must be hostile too — at least some times. Apparently essentially defensive.

After the last dispute between ♀ and the other young animal, ♀ went straight to the other animal and began to groom its throat and chest hair! And the other animal submitted to this grooming without the slightest attempt.

Celus capucinus, I October 15, 1960
Barro Colorado

I got a very young ♂ White face at the Gorgas Lab yesterday afternoon. Really a baby. By far the youngest I have ever had. I shall call him TP.

I haven't had much time to study his behavior yet, but I have note

I noted the following.

I spent part of yesterday afternoon carrying him around on my arm. He was obviously quite alarmed by the whole procedure, and also showed ridiculous of slight aggressiveness from time to time, but he was less strongly aggressive than any of the White-faces I have had before (with the possible exception of E). On my arm, he uttered notes nearly constantly.

The most common were single, whistle-like, sharp-ended notes, which might be transcribed by something like "Eeeeeeeeeeyuk"

Sometimes a lot of these "Eeeeeeeeeeyuk" notes (which I shall call "Eyks") were uttered without much variation in form. At other times, they seemed to intergrade, partially or almost completely, with a variety of other notes. I heard partial or complete intergrades between "typical" Eyk Notes and Squ Notes, between typical Eyk Notes and Q Notes, and (probably) between typical Eyk Notes and MGB's

All or most Eyk Notes were accompanied by rather slight opening and closing of the mouth. They (at least) were also accompanied by a very slight trace of Q2

These Eyk Notes might conceivably be some sort of juvenile or infantile distress notes, comparable to the QDC and KDC of young Pinche's and the WA Notes of young Night Monkeys; but I rather doubt it.

It is possible that "typical" Eyk Notes themselves are intermediate between Q Notes and typical Squ or WBll Notes.

These Eyk Notes are almost certainly closely related to the WB Notes uttered by E (see notes of Jan. 13, 1959, p. 21 ff), but I am not absolutely certain just what the relationship is. Perhaps the Eyks and WB's are only variations of a single pattern. Perhaps the "typical" Eyks are really intermediate between Q Notes and typical WB.

While P was on my arm, he frequently interjected single AlB Notes into series of Eyks. These were quite like the typical AlB's of older animals. Usually, or always accompanied by more extreme opening (and closing) of the mouth than the Eyks. Very little or no PL. Occasionally, for quite long periods of time, the AlB's were quite as frequent as the Eyks. During such periods, they tended to occur in alternation with the Eyks: 1 Eyk, 1 AlB, 1 Eyk, 1 AlB, etc. etc.

As the animal did not appear to be very greatly upset by the process of being carried, (it sat on my arm without making any effort to get off for minutes on end), I presume that both its Eyks and its AlB's were at least moderately low intensity. The AlB's presumably contain a stronger escape component than the Eyks (?).

Sometimes, while being carried, P would just open its mouth quite widely without uttering any audible sound. The mouth was usually only kept open in this way for a few seconds. I shall call this pattern "MO" (although it may not be strictly homologous with the MO of the Pygmy Marmosets). The MO's of P yesterday looked very much like "silent AlB's". Presumably lower intensity than the "vocal AlB's" (?).

This MO pattern is not quite the same thing as the pattern called BT in the preceding pages. When P performed MO yesterday, the corners of his mouth were not drawn back. I think that the MO's are probably much less aggressive than the silent BT's (or any of the vocal patterns accompanied by BT).

Another most peculiar pattern performed by P very frequently both yesterday afternoon and night, was a sort "chop-licking". He sticks his tongue out (moderately long and rapidly), sometimes appearing to "lick" his upper lip, between almost every note he utters. Also does it sometimes when he is being silent. I rather think this must be one of the "displacement" ac

twitters, of which the White-faces seem to have such an enormous repertoire.

Later in the evening, after P had been put in a cage and seemed to be getting used to it, he uttered quite a lot of S-Trills, alternated with Squ Notes and/or Eyle Notes, whenever I came near the cage. Few or no Al B Notes

P always screams, in all circumstances, just before and just as he is pulled up.

10:00 a.m. I have now taken P out of his cage in the animal house and brought him down to my house. Letting him run around more or less free.

He is still very vocal when handled or kept close to me this morning but he is uttering a rather different repertoire of calls. He still screams when pulled up, of course. Otherwise, he utters Trills, dBB's, and BB's almost exclusively.

His BB's sound quite like those of older animals. Quite variable. Some are much more plaintive than others.

He usually seems to utter Trill's, dBB's, and BB's, in random order. He does, however, seem to utter relatively more Trills when actually held by me, and relatively more BB's when a few feet away from me.

The loudness of his Trills is quite variable, but none of them seem to be quite as sharp and wooden-sounding as the extreme L Trills of older animals.

At one time this morning, P also uttered a number of B Trills. These appeared to be exactly intermediate between typical BB's and typical S Trill's.

As far as I can tell, he is not uttering any definite MGB's, although some of his shorter and more plaintive BB's almost approach being MGB's.

He seems to have quite given up uttering typical Eyle Notes this morning. At least 3 times, however, he has uttered S Trill Notes which ended

with a sharp "uk" syllable, like the Eyk Notes he uttered yesterday. More or less connected: ~~~~~~~~~~uk ~~~~~~~~~~ This would seem to be quite a clear indication that typical Eyk Notes are compound. I am now more than ever convinced that the sharp "uk" is an indication of S.

The fact that P does not utter Eyk Notes now, when he is presumably beginning to become accustomed to me, would suggest his Eyks of yesterday may have been produced by even stronger escape than his AlB's.

All his notes this morning, except Screams, seem to be accompanied by some definite PL. But this PL is less marked during AlB's than during the other notes. His mouth is opened more widely during the B patterns than during the Fill's. Usually opened more widely during AlB's than during BB's. The general effect of the open mouth during these notes is as follows:

during Fills during B patterns

The diamond-shape during B's is quite characteristic

During Screams, he almost always shows a definite trace of BT; but this is never very extreme. The mouth is usually quite widely open during the Screams; but his BT does not show off his teeth very well yet.

He still performs a lot of MO. Some of his MO's are obviously silent AlB's or BB's (with PL, and mouth diamond-shaped) while others seem to be silent Screams (with more or less BT).

He also still performs a lot of "chop-sucking". But no scratching, masturbating or chewing like other White-faces yet.

He has not yet performed any JVD.

When left totally alone, he usually rushes to a dark corner, and no

under them, silent and motionless, in Hdd. (tail not usually — or ever? — brought up in front of his face)

His usual high intensity "defensive" posture is facing me, standing up on his hind legs, knees flexed, and arms bent (the upper part of the arms hanging straight down, or down & forward — not akimbo — and the fore arms slightly raised).

After sitting quietly in Hdd in a dark corner for about a half hour, he allowed himself to be pulled up without resistance. Quite silent, without MO or BT. Then he uttered about 3 Squ's in my hand, and then began to utter S Hll's. Then when I let him go, he only went about 3 feet from me, and clumbed up a lamp. For several minutes, hanging on the lamp and watching me, he uttered lots of Hlls and occasional single brief plaintive notes, which were either very slight MGB's or some sort of "M". Only later did he begin to utter a few BB's and aLB's. All in all, he would seem to have been much less strongly hostile at this time than earlier. Which would suggest that the Squ's, S Hlls', and MGB and/or "M"s are either low intensity and/or less strongly hostile than the BB's and aLB's.

Then when I pulled him up again, he first screamed and then uttered a lot of aLB's and BB's, and only a few Hlls, while I carried him on my arm.

When I let him go again, he rushed away from me. He uttered one Q-like Note just as he went. (He also uttered one or two Q's or Q-like Notes after being let go earlier this morning. Perhaps it is only when he is let go that he really realizes how large I am.) Then clung to the leg of a table and uttered Hlls'. Then went to Hdd silently in a corner.

Then I took him up and put him back in his cage in the animal house.

Some time later, as I walking around the animal house looking at something else, I suddenly became aware that P was clinging to the side of the cage (nearest me), uttering a few S-Ills, lots of the MGB and/or M-like notes, and a variety of notes which seemed to range from typical "Eyk Notes to" pure "Whit's.

In these circumstances, the Eyks seemed to be nothing more than Whit's with an "uk" ending.

Some or all of these MGB and/or M-like Notes may be closely related to, or even identical, with the notes of E which I called "WB".

The S-Ills seem to be nothing more than Whit's with a quaver.

It was obvious, during this last incident, that the Eyk's could not have been very high intensity or very extreme alarm reactions.

Cebus capucinus, I October 18, 1960
Barro Colorado

I have only looked at P very briefly the last few days. His behavior seems to be relatively little changed.

When I am near him, but not too near, he spends most of his time uttering S-Ill's and single MGB and/or M-like Notes like those described above on Oct. 15. I think these latter notes must be essentially the same thing as the MGB's of older animals, but they are certainly much less back-like.

He also utters ALB's and screams when picked up. But I have not heard him utter any Eyks lately.

He seems to perform "chop-barking" much less frequently than when we first got him.

I am slightly puzzled by some of his BB's. These are quite like the BB's of older animals in sound, although a little mealier and less hoarse, but

many of them are not very obviously hostile. He tends to utter BB's in among his S Fill's and M and/or M&B - like notes, while he is clinging to the side of his cage his nearest me. He also usually or always tilts his head backward a little, "looking upward", when he utters a BB. This latter movement may be purely "mechanical", a physical necessity in order to produce the sound. But it does tend to enhance the generally non-hostile appearance of the BB's. Many of P's BB's, in fact, are quite reminiscent of "Lost Call" patterns.

P certainly defecates and urinates less frequently when alarmed, especially when pulled up, than either Howler Monkeys or Night Monkeys of comparable age and degree of tameness.

Cebus capucinus, I — November 7, 1960
Barro Colorado

We caught a wild Capuchin about a week ago. Adult. Has been kept in outside cage by itself. Today I am going to count its comfort activities, and more or less similar or related reactions, including "displacement" activities. Using same method as in count of Night Monkey comfort activities (see notes on Actus, Aug. 6, 1960).

~~~ = undisturbed

~~~ = disturbed

10:07 a.m. Jud. Jud Jud Jud Jud. Chews on wire side cage. FX-arm. Chews on side cage. Sticks out tongue. Sticks out tongue. Sticks out tongue. Sticks out tongue. Sticks out tongue FX-arm. FX-arm. FX-hand. Chews fingers of one hand. Sticks out tongue. (I shall call this "SOT" from now on). SOT SOT SOT SOT F-leg F-leg. SOT SOT. SOT. Chews fingers. F-leg. Chews on side cage. Chews on side cag

I, 5, 2 c. F-leg. B-side. Chews on side cage. Chews on side cage. Scratches tail, using both hands. Chews on side cage. Chews on side cage. Stopping observations 10:37.

I am surprised by the relatively few comfort and/or displacement activities performed by this animal.

It was obviously upset by my presence, probably more alarmed than aggressive. But by means very upset or frightened. Fed from time to time. Uttered quite a lot of NGB's. No other display patterns.

It tended to walk round and round the cage, following a definite set path. Relatively very few deviations. And the few comfort and/or displacement activities it did perform tended to occur always in the same places. All the chewing on side cage, for instance, occurred in the same corner of the cage (the one furthest away from me). Most of the scratching movements occurred when the animal was near the side of the cage nearest the other caged Capuchins (about 30 ft away).

This animal may already be creating new "traditions."

(The SOT bursts cited above is either the same thing as, or very closely related to, the "chop-licking" of P.)

Starting tests again 4:35 p.m. Chews on side cage. Chews on side cage. Chews on side cage. FX-hand. Chews on side cage. Chews on side cage. SOT. SOT. SOT. Chews on side cage. F-side. Chews on side cage. Jud. BX-hand. Jud. Jud. F-side. Chews on side cage. Chews on side cage. Jud. Chews on side cage. Chews on side cage. Chews on side cage. B-side. B-side. Chews on side cage. FX-arm. FX-arm. Chews on side cage. FX-arm. FX-arm. Chews on side cage. Chews on side cage. Chews on side cage. FX-arm. Chews on side cage. Jud. FX-arm. SOT, Jud. Jud. Chews on side cage. F-leg. Chews fingers. Chews fingers. Chews on side cage. F leg. F-leg. Chews

I ~~~ on side cage. Jud chews on side cage B-side. chews on side cage. FX-arm F. leg. B-side. chews on side cage. Evening observations 5:05 pm.

This animal (which I shall call "I" from now on) seemed to ignore me, pretty much (for a Capuchin) during the latter period of observation. Silent throughout. Did not feed. (it did feed twice during the observations this morning). Did quite a lot of BT toward the Capuchins in the far cage. Still following very regular paths. Did almost all its Jud in one spot — the same spot as this morning. Did all except one bout of chewing on side cage in one spot — the same spot as this morning.

At one time this afternoon, there was a fight among the Capuchins in the other cage. I noticed that the animal who was attacked reacted by uttering lots & lots of notes intermediate between typical screams and typical Trills. Screams with an extreme ~~~~~

I looked at H's behavior for some time this evening. It doesn't seem to have changed a bit.

Cebus capucinus, I. November 13, 1960
Bruno Colombo

Continuing tests with I. 11:15 a.m. FX-arm. chews on side cage. chews on side cage. chews on side cage. chews on side cage. chews on side cage. SOT. SOT. chews on side cage. F-leg. SOT. Juice. chews on side cage. SOT. chews on side cage. Rubs face on leg. Rubs face on leg. 7 times catches tail with hands. chews on side cage. SOT. F-leg. FX-arm. chews fingers. FX-arm. FX arm chews on side cage. SOT. SOT. FX-arm. chews arm. chews on side cage. chews fingers. FX-hand. chews fingers. chews fingers. SOT. chews on

Cebus capucinus, Nov. 13, 1960, II.

S Chews fingers Chews on side cage. F-leg. FX-hand. SOT. SOT. SOT. SOT. F-side. Chews on side cage. Chews on side cage. Chews fingers SOT. SOT. Chews on side cage. F-side FX-arm. Jud. SOT. SOT. Chews on side cage. Chews on side cage. SOT. SOT. SOT. SOT. Chews on side cage. Jud. Jud. Jud. Jud. Chews on side cage. Ending 11:45 a.m.

This animal behaved much as before this morning. Fed a little (two c). Uttered a very few MGB's. Did most of its chewing on the side of the cage at the same spot as before.

Cebus capucinus, I. November 14, 1960
Barro Colorado

I Starting experiment at noon. 5:06 p.m. Jud. General shake. F-side. SOT. SOT. Chews on side cage FX-arm. FX-arm. Chews on fingers. Chews on fingers Chews on side cage. Chews on side cage. Jud. SOT. FX-arm. Chews on side cage. Chews on fingers Chews on fingers Chews on fingers. Chews on side cage. FX-arm. Jud. Jud. Lunge. Lunge. SOT. SOT. Chews on fingers. Chews on branch. Jud. Chews on fingers. FX side. FX-side FX-side. Ending 5:36 p.m.

This monkey behaved much as usual this afternoon. Uttered quite a lot of MGB's and a few Wills, probably provoked by wild White faces.

Cebus capucinus, I. February 5, 1961
Barro Colorado

While I was away on vacation, the boys trapped a wild pregnant White face and kept her in captivity. She gave birth on January 12th. We let her keep the baby for a while, and then took it from her at 2:00

4 p.m. February 3rd. Now keeping the baby alone in a cage in the animal house, and trying to rear it by hand. (Incidentally, there are no other White-faced Monkeys in the animal house now.)

I think this baby is ♂? Eyes open and can see, but probably not very well. Can crawl about, but coordination generally very poor. Can't really stand up on legs yet.

I shall call this baby "Oskar" (Osk, for short).

When we first took Osk from its mother, it uttered lots and lots of BB's and SFlls, all jumbled up, not in any regular order.

The SFlls were mostly SFll's, but rather loud SFll's. Changing to LFll's when Osk actually tried to bite me. These LFll's were really quite hard and rattling, with extreme rrrrrr quality.

There seems to be no doubt but that Osk's Fll's are definitely hostile already.

The BB Notes were uttered singly, or in series. Series composed of 2, 3, or (very rarely) 4 notes. Presumably series of increasing intensity. The 3-note series are quite reminiscent of the Ab-type B of Howlers (although all the notes of a single series are usually more or less identical in pitch and loudness). When Osk uttered the BB's right after being taken from its mother, all the BB Notes were really deep barks. Sounded exactly like the BB of adults, but not quite as loud.

The BB Notes were uttered with "triangular" MO (as drawn on Oct. 13, 1960, p. 35) & PL. No BT. Some SFll's were uttered with the mouth open in the same way. Others uttered with mouth opened less widely.

After Osk had been in its new cage by itself about ½ hour, it began to settle down a little. Became less vocal. Uttered many fewer Fll's; but continued BB's more or less as before. This would suggest that its

BB is eventially or completely a "Last Call."

I left Ork alone for a while after it had begun to settle down, and then went back to see it around 5:30 p.m. It was asleep when I first approached it. Uttered single BB Notes when it first woke up and saw me. Then a single SrTrill. Then more single BB's when I walked away. Then continued to utter single BB's (just lying on towel, not making any obvious effort to do anything in particular). Also an occasional SrTrill, and occasional notes which seemed to be intermediate between typical SrTrill's and Eyk Notes like those uttered by PP. These latter notes were trills ending in a sharp "Ecyuk" sound.

Then I went back and picked Ork up. Immediately began to utter many more Trill's. Some quite loud. Probably "loud SrTrill's" rather than LrTrill's. Also occasional double BB's. In the intervals of these Trills and occasional BB's, Ork tried to bite me repeatedly. Also did quite a lot of chop-chewing, just like PP.

When I continued to hold it, gently, Ork gradually calmed down. Began to utter many fewer notes. Eventually only uttering single Squ's and a few single, brief, rattles undifferentiated B Notes, which may have been just low intensity BB, but were much less forceful-sounding, and may have been "MGB"s instead.

This would seem to confirm the theory that Squ's are low intensity. Also suggests that MGB's are moderately low intensity. Possibly undifferentiated moderately low intensity versions of several different kinds of higher intensity B patterns (more or less as indicated in diagram on p. 20, Jun. 13, 1959).

Ork continued chop-chewing after it had calmed down and only uttered Squ's and weak B notes. Chop-chewing is also obviously low intensity.

Then I started to experiment with Orik a little
Pulled it up roughly several times. This always provoked a burst of Fill's.

Left it alone a couple of times. This usually provoked single and double BB's, if I remained in the vicinity.

Then I put Orik down on the floor (on a towel) and stood where it couldn't see me. This apparently upset it. It began to utter lots of double and triple BB's. Obviously high intensity. Also quite a lot of Fills. These Fills were quite loud, but did not have a very compressed quality. Rather plaintive, almost like Wistl's. This calling continued for quite a while. The arrangement of the notes was rather interesting. Long periods of alternating single Fills with double or triple BB's in quite a regular fashion. ~~~~ -- ~~~~ -- --

~~ -- ~~ -- ~~

---- etc etc. But then the regular alternation would break down and continue irregularly for a while, until the regular alternation was restored again.

After a while, it became obvious that the third note of many of the triple BB's uttered by Orik was really a B Fill. Presumably a sign of declining intensity.

Then I picked Orik up and put it back in its cage, where it immediately fell asleep. Enchanted.

During this first afternoon, I noticed a few interesting movements by Orik.

It performed redirected (presumably attack) biting movements quite frequently when I held it. Biting its towel or its own hands when it could not get at me.

Several times, it "scratched" the top of its head. This occurred when

it was waving its arms around frantically, apparently trying to find some thing to clutch for support. I thought that these "scattering" movements might be nothing more than undirected clutches for support. It has not, to my knowledge, performed any other kind of scattering movements.

I have had almost no time to spend with Ork since 6:00 p.m. on February 3rd, but I have noticed a few additional behavior patterns and a few changes in some of its routines.

During the night of February 3rd, I had to pick it up quite a number of times. Twice it uttered screams just as I lifted it. Much like screams of adults, but much weaker. Several times, it uttered single AB notes. Very much like those of adults, only slightly weaker. Always uttered quite a lot of Jills and a few BB's when picked up.

During the last two days, Ork has been much quieter on the whole. But still very far from tame. Still tends to utter more Jill's than anything else when picked up. Also occasional brief scream and/or single AB. When I go up to its cage and talk to it, without picking it up, it tends to utter a few Squ's and weak B's (MGB's ?), in random order. Also a few very soft S-Jill's. Also a few brief soft, short, "Eeyuk" notes which may be a low intensity form of Eyk. Only very rarely a single or double BB.

There definitely appears to be some sort of correlation between BB's and Jill's. Every once in a while, for instance, Ork seems to get upset about something (possibly hungry) and crawls up the side of its cage, apparently looking for something. Usually tends to get stuck near the top of its cage, apparently unable to get down. At such times, it tends to utter lots and lots of both BB's (frequently double and triple) and Jills (loud S-Jill's).

Nevertheless, Ork has done nothing, during the last two days, to

disprove the theory that Sill patterns are largely or completely hostile, and B patterns are partly friendly. It is possible that the S Sill's contain a weak friendly component which is lacking in the L Sill's; but I am not sure about this.

As a result of my observations of Orb, I would say that two aspects of its behavior are particularly remarkable: (1) it seems to have a complete or nearly complete repertory of "adult" calls and notes, and (2) it does not seem to have any special juvenile distress call comparable to the distress calls of young Night Monkeys or Pitchie's.

Immediately after we took Orb from its mother, we let the mother loose. She followed us up to the animal house, and stayed there nearly continuously for a day and a half. Made repeated attempts to get near Orb. All this time, she uttered lots and lots of single AlB's, but no other call. I was surprised that she didn't have any special call to summon lost young.

As far as I could tell, Orb never responded to its mothers AlB's.

After writing all the above, I had to feed Orb again.

It was asleep when I took it out of its cage, and I handled it very gently. It only woke up a little at first. First uttered Squ's, and then worked up to S Sill's, a few Eyk Notes, just like the Eyks uttered by H, and a few single MGB's, and then subsided again and went back to sleep (as I had'nt got the milk ready yet).

It was silent as usual when I fed it.

When I put it down on a table, while it still clutched its towel, and it started to scratch its head. Movements like adults. Using hind leg to scratch same side of head. Quite silent throughout.

When I took it off its towel and put it on the floor, alone. Struggled violently as I had to tear it off the towel. Uttering Sill after Sill. Very low

d. I couldn't tell if they were loud S-Fall's or L-Fall's. Then when it was on the floor it alternated periods of lying flat with periods of crawling, or trying to crawl, forward. Uttering lots of the same loud Fall's and (usually double) BB's. There may have been a slight, statistical, correlation between periods of lying flat and uttering BB's and periods of crawling with Fall's, but both types of calls were uttered in both circumstances.

Then I picked Oak up and put it back in its towel. At first, it continued to utter both Fall's and BB's and repeatedly bit the towel. It showed a definite tendency to utter a Fall immediately before a bite. Then it stopped uttering BB, but continued to utter Fall's and bite. Then it stopped uttering Fall's and biting, and fell quiet, only uttering an occasional Squ (and one MGB).

It is possible, I suppose, that the Fall's are produced by exactly the same motivation as the BB, at a lower intensity - but I doubt it.

Celeus capucinus, I

February 15, 1961
Barro Colorado

I have not had much time to watch Oak recently, but his behavior does not seem to have changed much recently. Only quieter and, presumably, happier.

He has been feeding himself a little for at least a week now.

Today I took him out of his cage and put him alone on the floor. He uttered a huge variety of notes, all in a jumble. Squ's, Eyk's, Wtk's, S-Fall's, MGB's, brief undifferentiated B's (like MGB's, but less plaintive), and a few single and double BB's. Then, when I put my hand down beside it, he leapt on it, grasped it, uttered two or three BB Notes, and then just clung there, silent and apparently quite content.

Immediately afterwards, I gave him a bottle. He did not like being roped down, and struggled quite a bit. During this struggle he uttered lots and lots of SOH's, but nothing else. Good evidence that the SOH's are hostile.

Every once in a while, when I talk to Ork when he is sleeping or just lying quietly, he will lift his head and perform one or more Lip's. Accompanied by frowning, and "wrinkling up" his nose. Usually silent. Sometimes accompanied by one or two BB Notes, or undifferentiated B Notes. These Lip's, plus the accompanying frowning and nose-wrinkling, are very reminiscent of the movements he makes when he is feeding from his bottle, and breaks too fast and gets milk up his nose. I wonder if he has "learned" to perform these patterns apart from feeding as a "result" of having performed them during feeding ???? Does he do them apart from feeding because he would like to be fed ????

Tonight I put Ork on the floor by himself several times more. Uttered SOH's as I took him off my arm each time. Then usually a variety of B Notes when first put on the floor. Undifferentiated B Notes, MGB's, and both double and single BB's. Gradually became more frantic, after a few seconds on the floor. Started to move around, with frequent pauses to "catch his breath". In general, he tended to utter SOH's when moving with only occasional double and single BB's. When not moving, he usually uttered many double and single BB's, with only occasional SOH's. Some of the double BB's were composed of very long plaintive-sounding notes "Oooooooo aaaaaah".

Every once in a while he would try to climb up a chair. Always fell down. Each time he fell, he uttered a burst of loud SOH's and/or LOH's.

All this is beautifully confirmatory of my interpretation of the OH

and BB patterns!!!

Sometimes, when Ork was alone on the floor, if I approached him very rapidly, he would flinch and/or try to run away from me. At such times he usually uttered a medley of loud SFll's, alB's, and/or screams.

If I put my hand down beside him gently, he would clasp it. Sometimes uttering 1 or 2 BB notes just as he started to clasp.

Once I started to man handle him very roughly. He immediately uttered a burst of SFll's and alB's, jumbled together.

Every once in a while, when Ork is sleeping peacefully to my arm, especially a few minutes after settling down after some disturbance, he will utter a whole series of rapid "breathy" sounds. Defunctly not Mm. Remini cent of Spider Monkeys?

Cebus capucinus, I August 18, 1961
Barro Colorado

Unfortunately I have been too busy to study Ork during the last 6 months. He has been kept up in a cage by himself in the animal house all this time. Flourishing. At least half grown by now. He has not, I think, developed any new "learned" signal patterns.

Going to observe him this morning 7:30 a.m.

When I approach his cage and look at him, he responds by crouching a little, legs folded, hands invisible under chest, tail curled around body. Head not lowered. But this crouch may well be an "int. mov." of Hdd.

Quite a number of movements superimposed upon this crouch. One of them is "bouncing up and down". This may be a low intensity or incipient form of Jud, but it is not straight legged. Arms straight

used a little on the up movements, but never completely, and the hind legs are hardly straightened at all, even during the most extreme up movements. The hands never leave the ground on the up movements. Movements very clarice looking. Sometimes quite regular.

Another movement is SS. Quite regular. Sometimes combined with bouncing up and down, sometimes independent.

This mouthing and bouncing and SS is accompanied by lots of notes. Lots of S Hll's (quite loud, but not rattling like the L Hll's), and B Notes. These B's are a little difficult to decipher. More or less MOB. Possibly one or two tending to WB. Quite regular. Some quite sharp. Some almost ~

These S Hll's and B's seem to be jumbled together in a quite rand om order.

Ode also performs quite a number of Lh's from time to time during this performance. Usually combined with the B Notes. Occasionally combined with an S Hll. Sometimes silent? These Lh's may occur during either bouncing and/or SS.

When I approach Ode a second time, 7:40, I do so more obviously. Obviously frightens him a little more strongly. He had been playing unconcernedly in his cage. Then when he sees me coming, he utters 1 AB (quite like adults), dashes to a corner of his cage, and crouches as before. At first quite silent in crouch. MO, but no bouncing or SS. Then begins to relax a little. Begins to utter S Hll's, 1 L Hll, and do a little bouncing. Retains MO between notes. This MO a little different from the earlier pattern. Corners of mouth drawn back in a slight trace of BT.

It is obvious, I think, that silent MO and silent BT intergrade almost or absolutely completely.

When I move rather suddenly, without approaching Ork's cage, he crouches, utters 5 or 6 notes, including typical ABB's, typical B's, and intermediates between ABB's and B's. Then begins jumble of bouncing, SS, and Lsh's. At first silent. Then accompanied by fqu's, and a few SHH's. Apparently jumbled in random order.

There is certainly no invariable correlation between Lsh's and a single type of vocal pattern in this species.

When playing about undisturbed in his cage, by himself, Ork is largely silent. Only uttering occasional single MGB's. Obviously low intensity MGB's. Thin and relatively soft. Almost (but not quite) intermediate with WB's.

I have been writing this down sitting quietly in a chair about 10 ft. away from Ork's cage. When I get up and move away, without approaching Ork's cage, he crouches, begins bouncing and Lsh's. At first silent. Then utters SHH after SHH as I get further and further away.

When I approach Ork again (3rd time, 7:55), I do so very gently. He immediately goes to far side of cage. Crouches. Then begins bouncing. Silent at first. Then begins to utter SHH's, continuing bouncing. Then begins to perform Lsh's, continuing bouncing. Immediately after the first Lsh, utters one MGB. Then resumes SHH's. Continues bouncing. Then starts Lsh's again. Then Lsh's are silent at first. SHH's still uttered between Lsh's. Then utters a few MGB's. With Lsh's. Then silent Lsh's again. Still bouncing from crouch. Then utters MGB, with Lsh, & frown, mouth open, tongue pumped in and out a couple of times, now "mumbled." This seems to be the same thing as the "pseudo suckling" behavior described above on Feb. 15, 1961, p. 48. Then does a little more of this "pseudo nibbling", silently, while continuing bouncing and Lsh's.

Then gets up, comes 2 or 3 ft closer to me. Crouches again. Resumes bouncing with Lili's. Some Lili's vocal. Others with MOB's. Occasional SOH's between Lili's.

This incident is another indication that Lili's, MOB's, and "pseudo-suckling" are partly friendly.

At one time during this incident, after Ork had come closer to me and one some bouncing, Lili's, & MOB's, he suddenly started an extremely vigorous burst of scratching. Using both hind legs and front legs scratching sides and legs. All this done while he was still more or less crouching. Movements very rapid. As a result of all this activity in the crouch, he lost his balance, and fell over on his back. Continued to scratch while on his back. At the same time, he tended to remain all curled up, in more or less same position as crouch, but upside down (in discussion below tended to roll from side to side (presumably because his balance was off). All this was quite silent. Then Ork righted himself. Resumed bouncing up and down, in semi-crouch, with Lili's. Occasional MOB's.

This rolling over & frantic scratching was just slightly reminiscent of the "fits" which the Red Wakari at the Washington Zoo used to throw!

Ork first began bouncing up and down from a crouch posture months ago, in late February or March. At this time, he still had a towel as a mother substitute. He always did all his bouncing while holding on to the towel with hands and feet. Part of his crouch pattern appeared to be an attempt to keep a firm grasp on the towel. So his crouch pattern as a whole may be partly an intention movement of Hdd and partly a "reminiscence" of clutching the "fur" of his "parent".

When the boys suddenly start to talk loudly. Ork responds

by uttering a whole burst of S's, a bouncing. Celia through S-Hill's

While waiting for his food, undisturbed, Ork does a lot of playing in his cage. Running about. Looping the loop around branches. Etc. Etc. Also rules his thumbs (either hand) quite frequently. Silent.

My observations interrupted 8:30 - 8:55. While I go out of the building.

As I start to return, Ork can see me about 50 ft away, outside the building. Begins to utter loud S-Hill's. Also some S-Hill's ending in "Eeyuks" sounds. There are obvious intermediates between typical S-Hill's and typical Eyles. All the notes with a little bouncing.

Then, when I come into the house and sit quietly down in my observation chair, Ork begins the usual crouch & bouncing. This time with little or no SS. With lots of Sh's. Combined with a mixture of S-Hill's and B notes. Some of these B notes are typical MGB's, Others are longer. Low intensity BB's or intermediates between MGB's and BB's. He seems to have a definite tendency to utter the BB-type notes with Sh's.

I think it might be safe to say that Sh's are correlated with B complex patterns, if not with a single particular type of B.

Any sudden loud sound or vigorous movement nearly usually provokes a burst of S's or (ABB-S)s by Ork.

Every once in a while, when Ork is playing undisturbed in his cage, he will crouch for a second or so and do a little bouncing. Silent. This is probably a hostile reaction provoked by some weak stimulus (although I can seldom or never determine what the stimulus actually is).

This would suggest that silent crouching and bouncing is lower intensity than crouching and bouncing with calls. (It is obvious that Ork is not more afraid when he does this than silent crouching and bouncing

than when he does vocal crouching and bouncing)

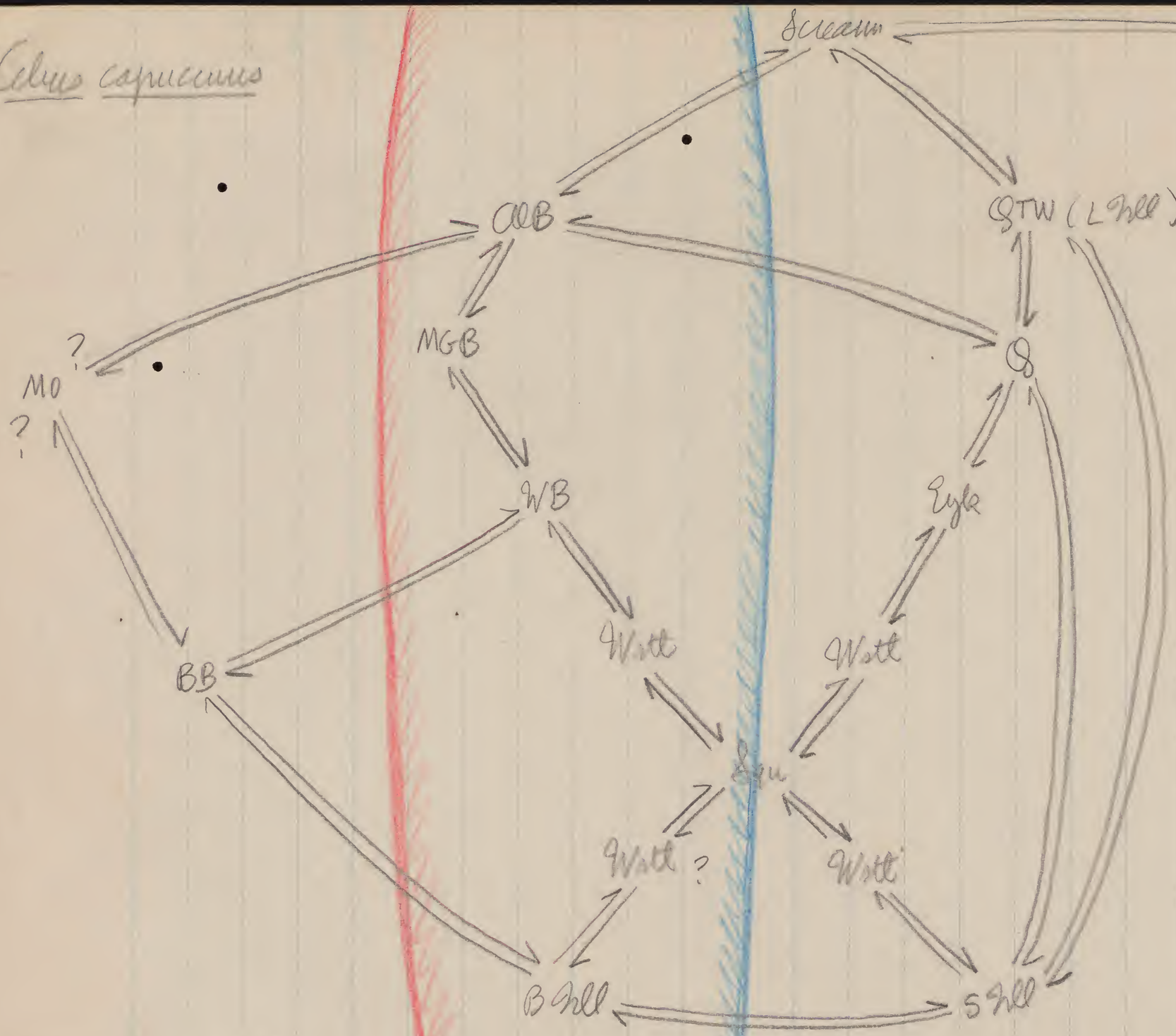
At 9:25, I approach Orlo again (for the 4th time). This time I approach gently, but go particularly close to the cage, and sort of lean toward Orlo. He responds by crouching. His crouching particularly low. Almost pure X-ld, except that Orlo keeps his head up, sort of looking at me out of the corner of his eye. Utters SHH after SHH in this posture. Then, when I walk away, he immediately begins to utter BB's, at least 4 or 5, one after the other. Then does a little bouncing. (The first part of this bouncing was accompanied by the last BB, I think. Then the rest of the bouncing was silent.) Then utters one Squ. Relaxes.

This is good evidence that BB is utter partly formally and/or more aggressive than SHH's. Probably the former.

At 9:35, I approach Orlo again (for the 5th time). Move as before. Gentle approach, but I don't go quite as close as during the 4th approach. Orlo responds by crouching, uttering SHH's. Then begins to do a little bouncing, still crouch. Still uttering SHH's. Then begins to do Jolt's as well as bouncing. Still uttering SHH's. At least once, one of the Jolt's was absolutely synchronous with an SHH. Then, when I move away, Orlo immediately utters a whole bout of BB's. These BB's were quite short. But definitely bisyllabic. Some more "Eeyah" than "Ooah." At the same time, Orlo tried to follow me. Coming to side of cage nearest me.

Stopping observations; 9:40 a.m.

Celus capuccinus



As of Feb. 15, 1961

Everything right of red = hostile
Everything left of blue = friendly

Perhaps BB (= MO ?), being purely infantile, should not be included in this diagram

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